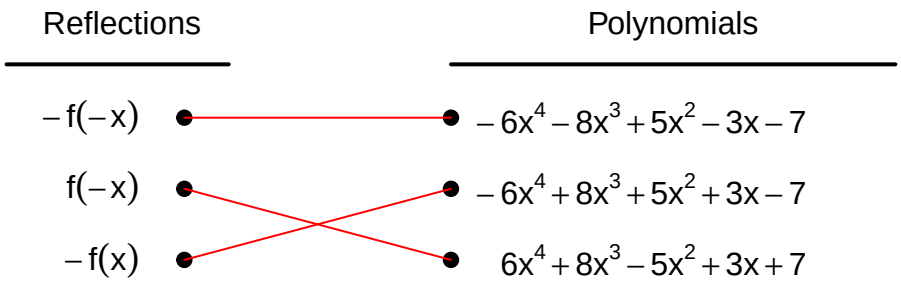
Name: Date:

# Exam: Function Reflections (Solution version 600)

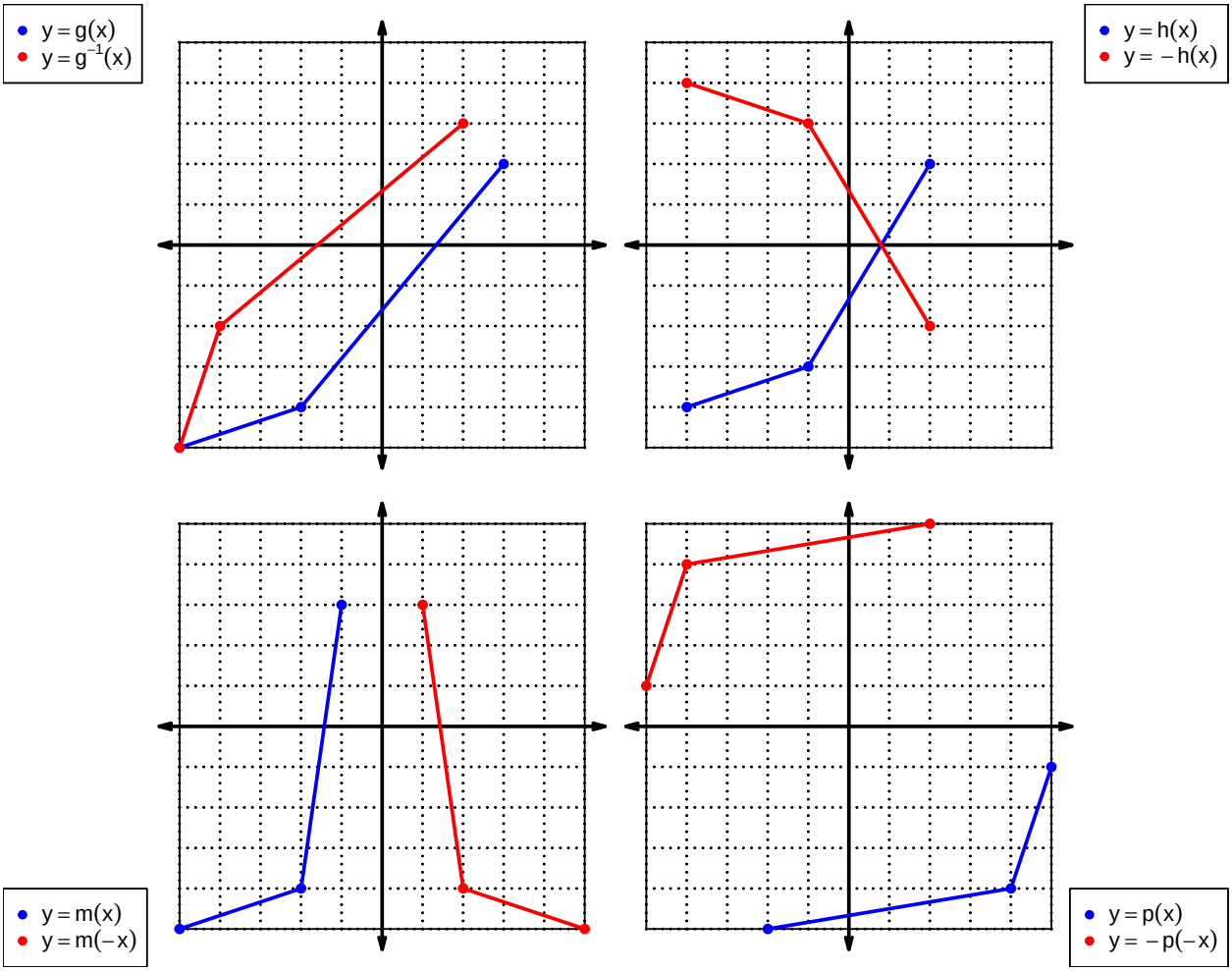
1. (worth 9 points) Let function $f$ be defined by the polynomial below:

$$f(x) \;=\; 6x^4 - 8x^3 - 5x^2 - 3x + 7$$

Draw lines that match each function reflection with its polynomial:




2. (worth 20 points) In each $xy$ plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The $x$ axis is horizontal and the $y$ axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions $f$, $g$, and $h$ are defined by the table below.

| $x$ | $f(x)$ | $g(x)$ | $h(x)$ |
|---|---|---|---|
| 1 | 7 | 5 | 6 |
| 2 | 4 | 7 | 2 |
| 3 | 2 | 9 | 5 |
| 4 | 6 | 3 | 9 |
| 5 | 1 | 6 | 7 |
| 6 | 8 | 2 | 4 |
| 7 | 9 | 4 | 3 |
| 8 | 3 | 8 | 1 |
| 9 | 5 | 1 | 8 |

3. (worth 3 points) Evaluate $h(6)$.

$$h(6) = 4$$

4. (worth 3 points) Evaluate $f^{-1}(2)$.

$$f^{-1}(2) = 3$$

5. (worth 3 points) Assuming $h$ is an **odd** function, evaluate $h(-7)$.

If function h is odd, then

$$h(-7) = -3$$

6. (worth 3 points) Assuming $g$ is an **even** function, evaluate $g(-5)$.

If function g is even, then

$$g(-5) = 6$$

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7. (worth 15 points) A function, $f$, is **even** if $f(x) = f(-x)$ for all $x$ in the domain. A function, $g$, is **odd** if $g(x) = -g(-x)$ for all $x$ in the domain.
Let polynomial $p$ be defined with the following equation:

$$p(x) = -x^2 + x$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 + (-x)$$
$$p(-x) = -x^2 - x$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^2 - x\right)$$
$$-p(-x) = x^2 + x$$

c. Is polynomial $p$ even, odd, or neither?

neither

d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so $p$ is neither even nor odd.

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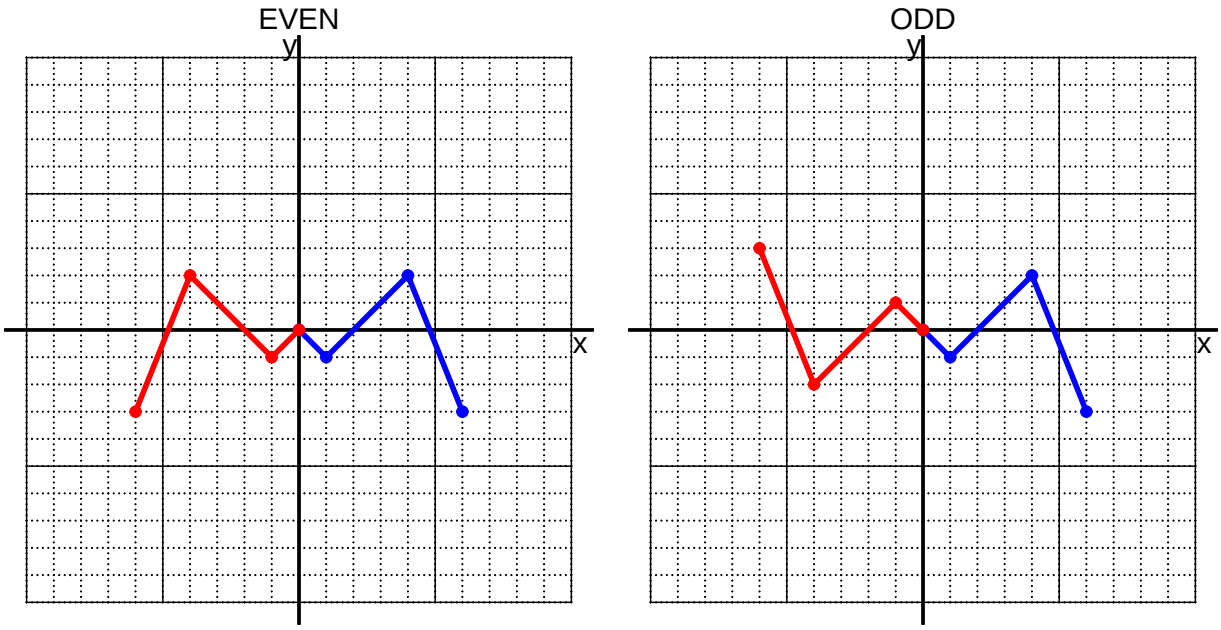
8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.




9. (worth 10 points) Let function $f$ be defined with the equation below.

$$f(x) = \frac{x-4}{5}$$

a. Evaluate $f(64)$.

step 1: subtract 4
step 2: divide by 5

$$f(64) = \frac{(64)-4}{5}$$
$$f(64) = 12$$

b. Evaluate $f^{-1}(9)$.

step 1: multiply by 5
step 2: add 4

$$f^{-1}(x) = 5x+4$$
$$f^{-1}(9) = 5(9)+4$$
$$f^{-1}(9) = 49$$

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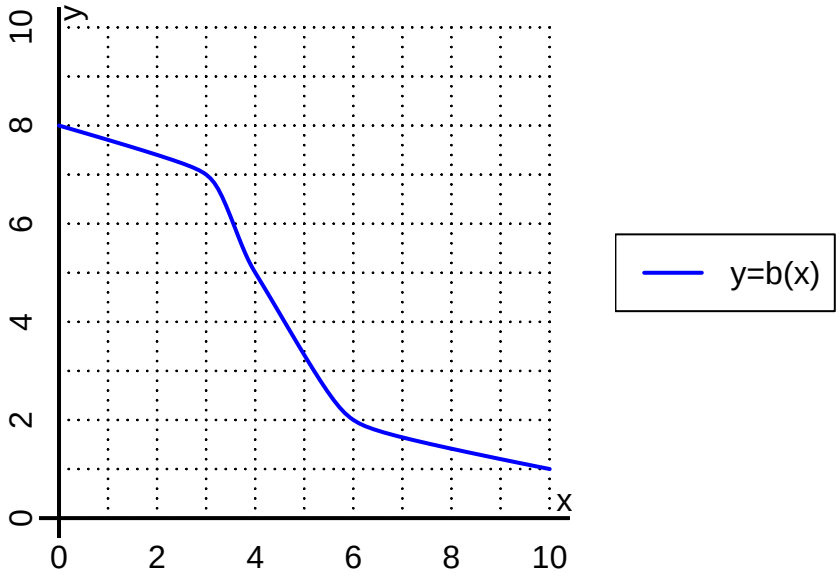
10. (worth 6 points) The function $b$ is represented by the curve $y = b(x)$ graphed below.




a. Evaluate $b(6)$.

$b(6) = 2$

b. Evaluate $b^{-1}(5)$.

$b^{-1}(5) = 4$

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11. (worth 18 points) Function $f$ is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

| $x$ | $f(x)$ | $-f(x)$ | $f(-x)$ | $-f(-x)$ |
|---|---|---|---|---|
| -2 | -9 | 9 | -9 | 9 |
| -1 | 6 | -6 | 6 | -6 |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 6 | -6 | 6 | -6 |
| 2 | -9 | 9 | -9 | 9 |

b. Is function $f$ even, odd, or neither?

even

c. How do you know the answer to part b?

Function $f$ is even because column $f(-x)$ matches column $f(x)$ exactly.